

Microcomputer Products
I.P. Sharp Associates
2 First Canadian Place
Suite 1900
Toronto, Ontario
Canada M5X 1E3
(416) 364-5361

Personal SHARP APL

SHARP APL for Personal Computers

SHARP APL, I. P. Sharp's extended version of the APL programming language, can now be used on most members of the IBM Personal Computers. It offers the **same** APL available as SHARP APL/370, the implementation for IBM System/370 mainframes, with all the latest features and extensions.

There are two versions of SHARP APL for Personal Computers:

- SHARP APL/PCX is for use on the IBM Personal Computer XT/370 or AT/370; it takes full advantage of the hardware emulation these machines offer.
- SHARP APL/PC is for use on the IBM Personal Computer, PC/XT, PC/AT, IBM Portable PC, XT/370 or AT/370.

Both SHARP APL/PCX and SHARP APL/PC offer the same implementation of the APL language, auxiliary processors and session manager. The principal difference is in the dramatically increased speed of execution in SHARP APL/PCX, which takes full advantage of the XT/370 architecture.

SHARP APL/PCX and SHARP APL/PC are by far the most complete implementations of APL available on a microcomputer today and, as such, provide an excellent tool for learning APL. They also offer a stable and consistent environment for application development.

With either version, I. P. Sharp offers not just a full implementation of the SHARP APL language, but one which takes advantage of the many years of development that have made SHARP APL one of the most reliable, efficient, and well-used systems available today.

SHARP APL integrates hardware, software and communications

I. P. Sharp has the most advanced offering of products for your office or information centre. I. P. Sharp has achieved the modular integration of hardware, software, and communications. Microcomputers, large centralized data bases (private and public), end-user software products, and worldwide communications are woven into a single, productive, manageable environment. SHARP APL is the common software link among these components.

Compatibility and integration of mainframe and micro environments are a technical challenge. I. P. Sharp has chosen to meet this challenge by implementing a complete SHARP APL system on the Personal Computer making the *same programming language* available on mainframe and micro.

What is SHARP APL?

APL is a powerful, concise, and logical programming language that is both easy to learn and to use. Because it is an interpreted language, APL allows programming faults to be remedied as soon as they're exposed - in the middle of testing a program. APL is also an extraordinarily flexible language, for both programmers and end users.

SHARP APL incorporates many powerful extensions to APL - including enclosed arrays, complex numbers, and an enlarged set of operators and functions. The language is supplemented by a comprehensive set of system variables, system functions, and system commands for report formatting, event trapping, packages, workspace storage and retrieval, and a component file system.

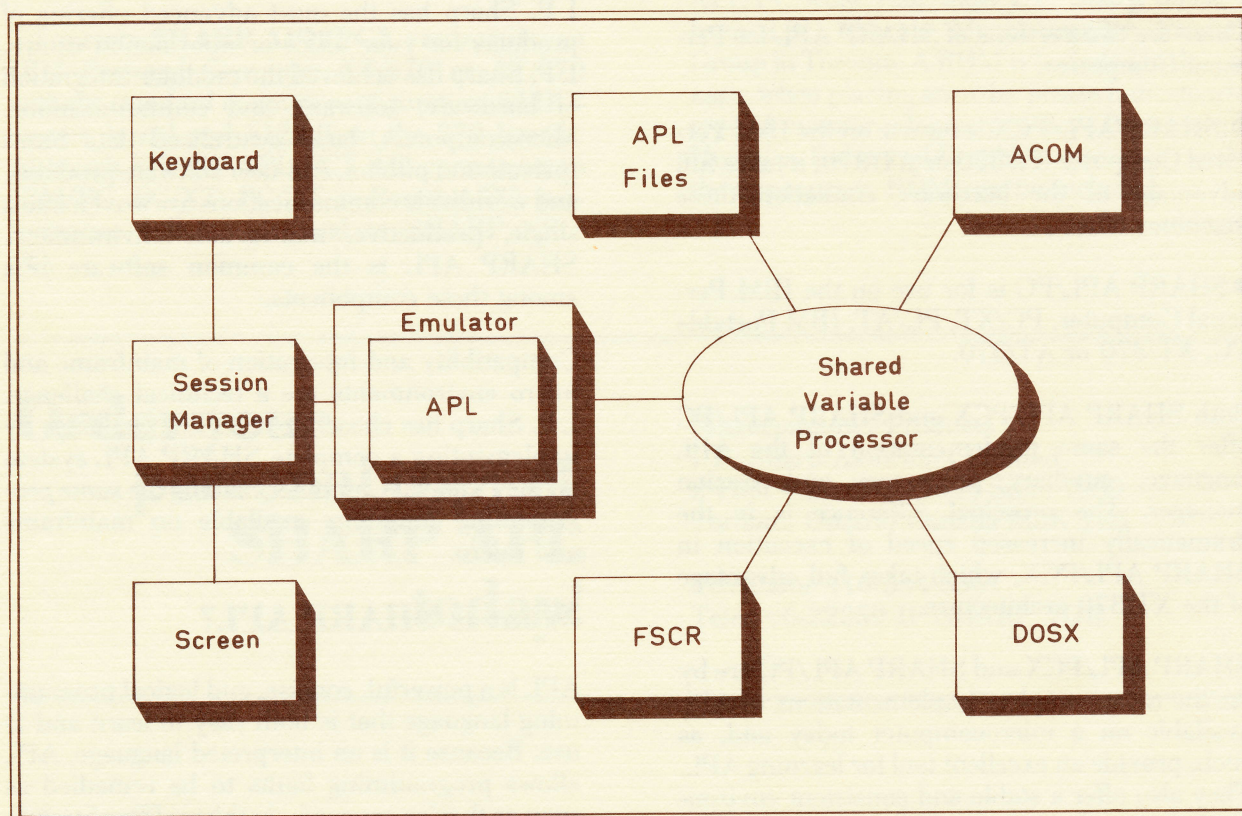
SHARP APL/PCX and SHARP APL/PC are the full SHARP APL, incorporating all of I.P. Sharp's advances made over the past fifteen years. Variables and functions are stored with the same representation as in mainframe-based SHARP APL. This means, for example, that booleans are stored eight per byte, that numbers have 18-digit precision, and that the results of calculations on the PC are identical to those on a mainframe.

SHARP APL is not affected by the Personal Computer's 16-bit architecture; for example, the maximum size of an array of data is limited solely by the memory available and not by the PC's internal restriction of 64KB. And there is no restriction on the size of an individual axis of an array, other than that imposed by the workspace available.

How does SHARP APL work on a Microcomputer?

SHARP APL/PCX was designed to maximize the hardware capabilities of IBM XT/370 and AT/370 Personal Computers which allows a Personal Computer to understand instructions usually only understood by large mainframe computers. SHARP APL/PCX operates using PC DOS. IBM's VM/PC operating system is not required. (An IBM PC/XT or PC/AT may be upgraded to an XT/370 or AT/370 with the inclusion of two expansion boards, available from IBM.)

SHARP APL/PC uses a software emulator to make an IBM Personal Computer (or XT, AT, or Portable) behave like a computer with an IBM System/370 instruction set. The emulator is necessary because IBM Personal Computers (without 370 boards) are very different computers from IBM mainframes. They have a different architecture, instruction set, and operating system. The software emulator makes these differences invisible.



Features of SHARP APL

The Shared Variable Processor

Shared variables provide a well defined means by which distinct processors can communicate with each other. In SHARP APL/PCX and SHARP APL/PC, shared variables supply a means for a task running in APL to send requests for work to an auxiliary processor. The auxiliary processor functions as a slave, waking up when given a task to perform. These processors are built for special purposes and in the IBM PC provide a software layer around a piece of hardware.

The use of a standard shared-variable protocol allows concurrent processes to be synchronized. Perhaps most important of all, the auxiliary processor can provide services to other masters. For example, the APL task that is requesting services of an auxiliary processor could be running on another PC or even on a mainframe; the controlling program might not be APL - it could be written in C or assembler or whatever is appropriate for the application at hand. Such flexibility is the cornerstone of integrated applications.

The Auxiliary Processors

Three auxiliary processors are supplied with SHARP APL/PCX and SHARP APL/PC. Taken together, they give the APL programmer full control of the peripherals on a Personal Computer.

The DOS Interface Auxiliary Processor (DOSX) provides access to a variety of services outside the APL environment. These include the use of DOS files, peeks and pokes of main storage, calls to DOS routines (for example, DIR), printing via the parallel port (including APL characters), and a generalized means of calling non-APL code.

The Asynchronous Communications Auxiliary Processor (ACOM) provides the means for using the PC's serial ports to communicate with remote mainframes, or to drive plotters, printers, and other serial devices.

The Full Screen Manager (FSCR) provides a means of creating menus and forms that can be used as user interfaces. Such forms appear on the screen and give the user the opportunity to work anywhere on the full screen. This product is upward compatible with the IBM mainframe product AP124, as enhanced by I. P. Sharp.

The Session Manager

When a user is conducting a session with APL, there is a two-way stream of traffic: keyboard entries are sent to APL, and APL sends back the results of what it has been asked to do. Along the way, a variety of tasks are performed by the Session Manager before input is acceptable to APL and output is readable by the user. Some of the tasks involved are: appropriate translation of characters to handle different keyboard layouts, overstrike creation and resolution, and the management of a log of all traffic during the session. The session log allows you to scroll through earlier work (both horizontally and vertically) and to recall earlier portions of the dialogue for reexecution.

Keyboard

SHARP APL/PCX and SHARP APL/PC use the *union keyboard*, which is the standard typewriter keyboard with APL's special characters available in the alternate case.

This is much more natural for beginners than previous APL keyboard conventions, and experienced APL users adapt to it easily.

What you get - SHARP APL/PCX

Each copy of SHARP APL/PCX includes:

- three diskettes containing the SHARP APL/PCX system and utility programs
- the *SHARP APL/PCX Handbook*
- the *SHARP APL Pocket Reference*
- an APL Character ROM
- APL keyboard stickers

Each copy of SHARP APL/PC includes:

- two diskettes containing the SHARP APL/PC system and utility programs
- the *SHARP APL/PC Handbook*
- the *SHARP APL Pocket Reference*
- an APL Character ROM
- APL keyboard stickers

As well, a wide range of APL-related publications is available from I. P. Sharp Associates, including the *SHARP APL Reference Manual*, which is the definitive text for SHARP APL.

What you need

To use SHARP APL/PCX or SHARP APL/PC you require:

- A 5-1/4" double-sided diskette drive
- The IBM monochrome display/parallel printer adapter or the IBM colour/graphics adapter, or an IBM Enhanced Graphics Adapter and a monitor that functions with your adapter. Best results are achieved with the monochrome display/parallel printer adapter and the IBM monochrome display.
- An APL character ROM installed on the display adapter card. This ROM is not necessary if you already own a comparable ROM, or if you do not need APL characters. If an IBM Enhanced Graphics Adapter (EGA) is used, a diskette containing an APL character file for downloading is available instead of the ROM.
- IBM Personal Computer Disk Operating System (DOS), version 2.0, 2.1, 3.0 or 3.1.

To operate **SHARP APL/PCX** you require an IBM Personal Computer XT/370 or AT/370 with the standard memory configuration, 512KB system board and 512KB on the 370 boards. Although SHARP APL/PCX will operate on an IBM/PC, PC/XT, PC/AT or Portable PC, performance will be identical to SHARP APL/PC.

To operate **SHARP APL/PC** you require an IBM/PC, PC/XT, PC/AT, or Portable PC with 512KB of memory to run the complete SHARP APL/PC system, including all auxiliary processors; for a complete system, 640KB is recommended. However, a SHARP APL/PC system can run in as little as 384KB.

Services and Support

Programming and consulting: Any I.P. Sharp office throughout the world will be pleased to supply you with programming, consulting, or education services on a contractual basis. I.P. Sharp offices are staffed by experts knowledgeable about APL and other I.P. Sharp products.

Newsletter: *IPSA News* is issued by free subscription. It contains articles on topics of interest to all I.P. Sharp customers, including users of SHARP APL/PCX and SHARP APL/PC.

Ordering Personal SHARP APL

You can order SHARP APL/PCX or SHARP APL/PC from your local I.P. Sharp office, or from I.P. Sharp's Microcomputer Products Group in Toronto. A ROM is included in the package, when placing an order please indicate what type of monitor adapter you have (for example, Hercules, Enhanced Graphics or other) so that the appropriate ROM can be included.

Order your personal copy of **SHARP APL** today!

Microcomputer Products
I.P. Sharp Associates Limited
2 First Canadian Place, Suite 1900
Toronto, Ontario Canada M5X 1E3

Telephone 416 364-5361
Telex 06-22259 IP SHARP TOR